NATURAL RESOURCES CONSERVATION SERVICE
CONSERVATION PRACTICE STANDARD

WATERING FACILITY

(No.)

CODE 614

DEFINITION

A device (tank, trough, or other watertight container) for providing animal access to water.

PURPOSE

To provide watering facilities for livestock and/or wildlife at selected locations in order to:

- Protect and enhance vegetative cover through proper distribution of grazing;
- Provide erosion control through better grassland management; or
- Protect streams, ponds and water supplies from contamination by providing alternative access to water.

CONDITIONS WHERE PRACTICE APPLIES

This practice applies to all land uses where there is a need for new or improved watering facilities.

CRITERIA

General Criteria Applicable to All Purposes

A trough or tank shall have adequate capacity to meet the water requirements of the livestock and/or wildlife. This will include the storage volume necessary to carry over between periods of replenishment. Animal water requirements can be obtained from the NRCS Engineering Field Handbook, Table 11-1.

Where water supplies are dependable and livestock are checked daily, troughs with little water storage capacity may be used. Troughs or tanks must provide the daily water requirement of the livestock and provide access to the entire herd within a short period of time.

Trough or tanks will be located to provide easy access for livestock where concentrated animal traffic will not cause excessive erosion and where they will best help to distribute grazing within the fields. Where possible, troughs or tanks will be located in fence lines in order to provide water to more than one field.

In intensive grazing systems, the trough or tank may be portable in order to permit movement from one subdivision to another or within the subdivisions.

The site shall be well drained; if not, drainage measures shall be provided. Areas adjacent to the trough or tank that will be trampled by livestock shall be graveled, paved, or otherwise treated to provide firm footing and reduce erosion. A minimum of 6 feet around entire tank shall meet Livestock Use Area Protection Standard 557i.

Automatic water level control and/or overflow facilities shall be provided on all troughs or tanks. Provisions for draining the tank or trough shall be provided for each installation. Overflow pipes may be used as the trough drain when installed such that removal of the overflow standpipe will allow complete drainage of the trough or tank. Valves or pipes shall be protected to prevent damage by livestock by:

- Using galvanized steel standpipes, or
- Installing valves and/or standpipes near the center of the trough out of reach of livestock, or
- Installing a metal, wood, concrete, fiberglass, or other equally durable plate across the top of the tank in a manner that will prevent livestock from coming into contact with the valve or standpipe, or
- Install PVC Pipes with Fernco or equivalent flexible type coupler near the bottom.

Overflow shall be piped to a stable or suitable point of release, but at least 8 feet from the outside edge of the trough or tank. Some provision for draining the tank should be considered. This could be accomplished by installing a pipe plug with end cap in the sidewall of the tank, or a pipe sleeve on the outlet standpipe near the bottom of the tank. The trough and outlet pipes shall be protected from freezing and ice damage. Freeze-proof troughs or electric heaters may be used.

When a roof is placed over the trough to provide shade, the roof shall be designed for appropriate snow and wind loads and shall be durable to withstand anticipated livestock and wildlife activities.

All materials shall have a life expectancy that meets or exceeds the planned useful life of the installation, but all materials shall have a minimum life expectancy of 10 years. Common construction materials are reinforced concrete, steel, fiberglass, plastic and wood. All designs shall meet the industry standards for the material being used. Generally applicable design requirements and procedures can be found in the documents referenced at the end of this standard.

Precast Concrete Tank requirements are: 5,000 PSI concrete at 28 days; 6% $\pm$ 1% air content; ODOT approved aggregate; tapered inside wall at 1 inch horizontal to 6.5 inches vertical; reinforcement steel shall be #4, grade 60, rebar on 12 inch center to center horizontal and vertical; and brass or PVC couplings with antiseep collars.

Galvanized steel tanks shall have a minimum thickness of 20 gauge. Plastic and fiberglass structures shall be made of ultraviolet resistant materials or shall have a durable coating to protect the structure from deterioration due to sunlight.

Permanent automatic waterers and lightweight plastic or steel troughs or tanks will be anchored or otherwise protected to prevent livestock from moving or damaging the watering facility by pushing on the sides. This can be accomplished by anchoring the facility to a concrete pad, minimum of 4 inches thick, and/or placing a solid wood, steel, or other rigid fence around the facility. Portable facilities shall be monitored and protected by uses of electric fences as the grazing system dictates.

Used heavy equipment tires may be used as troughs or tanks. The landowner is responsible for determining that the used tire has never been filled with any fluids that may be toxic to animals or that it has been flushed so there are no residues of toxic material in the tire. Tire troughs will be installed as detailed on the drawings. Tire troughs shall be installed by preparing the foundation and installing the plumbing as required for other type troughs or tanks. The tires shall be placed on a compacted clay or gravel pad as site conditions dictate. The opening in the top of the tire shall be enlarged to allow easy access by livestock, except the remaining rim shall be a minimum of 8 inches. The hole in the bottom of the tire shall be sealed with 4 to 8 inches of concrete. All material utilized shall conform to the applicable Ohio standards and specifications.

Pipes in and through the walls or bottom of troughs will be sturdy and durable. The minimum diameter will be 1 ¼ inches for gravity flow systems and ¾ inches for pumped pressure systems. However, the diameter will be no smaller than the pipeline feeding the trough or tank. Any of the pipes listed on Ohio Conservation Practice Standard 516, Pipeline, are acceptable outside of the trough, except that polyethylene pipe will not be used where it will be exposed to sunlight. Pipe through the walls or bottom and inside the trough or tank will be polyvinyl chloride (PVC), or galvanized steel meeting the specifications as outlined in Ohio Conservation Practice Standard 516, Pipeline.

Collars will be installed where pipes pass through the wall or bottom of the trough or tank.

Openings cast in precast concrete troughs or tanks for installation or plumbing will be filled with a nonshrink hydraulic cement or epoxy after installation of the plumbing.

Portable Troughs or Tanks

Portable troughs or tanks will only be used as part of an intensive grazing system where it is necessary and advantageous to move the watering facility from subdivision to subdivision. They will not be used where water is needed during freezing weather.

These troughs will normally be lightweight plastic or metal troughs. If desired, they may be installed on permanent concrete or gravel pads (minimum 4 inches thickness) or installed on a treated wood or metal skid.

Troughs on skids will be moved to the desired location, leveled with blocking, and anchored to prevent movement.

All portable inlet and outlet pipelines will be protected from livestock damage by burial, installation of shields or covers such as steel casing, or by installing the pipe overhead or along fence lines. Steel pipe will not require special protection. Provisions will be made to drain all above ground inlet and outlet pipes during freezing weather.

Shields or covers installed to protect pipes shall be staked or otherwise fastened to prevent livestock from moving the shield or cover and causing damage to the pipe or connections.

Pipes installed overhead or along fence lines will be attached to a continuous treated woo d or steel support that will prevent sagging in the pipe or damage by livestock.

Site pads should be located so the trough may be utilized in two or more subdivisions, reducing the need to move the trough as frequently. The pads will incorporate anchor bolts, fence posts, or other measures that will prevent movement of the trough by livestock. The pipeline will be installed so it is protected from damage, while the site is being used and when the trough is at another location.

CONSIDERATIONS

This practice may adversely affect cultural resources and must comply with GM 420, Part 401.

Topography should be evaluated to minimize trail erosion and flooding erosion from tank overflow.

Watering facilities should be accessible to small animals. Escape ramps for birds and small animals should be installed.

Adequate protection for livestock during the winter should be considered.

Inlet pipes should be installed with a capped clean-out pipe extending under and beyond the edge of the trough or tank, particularly where silt or sediment may enter the system.

Overflow pipes should be protected with leaf guards when troughs or tanks are installed in or near wooded areas.

PLANS AND SPECIFICATIONS

Plans and specifications for installing troughs and tanks shall be in keeping with this standard and shall describe the requirements for applying the practice to achieve its intended purpose. If the trough and/or tank is a component of a system that includes additional conservation practices, the information necessary to construct these additional practices will also be conveyed on the plans.

Development of plans and specifications will be in accordance with the National Engineering Handbook (NEH), Part 650, Engineering Field Handbook, Chapter 5, and shall be in accordance with National Engineering Manual (NEM), Parts 541 and 542.

OPERATION AND MAINTENANCE

An O&M plan specific to the type of installed trough or tank shall be provided to the landowner. The plan shall include, but not be limited to, the following provisions:

- Check for debris, algae, sludge or other materials in the trough which may restrict the inflow or outflow system;
- Check for leaks and repair immediately if any leaks are found;
- Check the automatic water level device to insure proper operation;

- Check to ensure that adjacent areas are well protected against erosion;

- Check to ensure the outlet pipe is freely operating and not causing erosion problems; and

- Prepare guidance for winter weather, such as adding material in the storage area to allow for ice expansion without damage.

Algae and iron sludge accumulation should be addressed in areas with water quality that is known to cause problems. Chemicals such as copper sulfate and chlorine can be recommended as needed, as long as local rules and regulations are followed.

REFERENCES

Engineering Field Handbook

National Engineering Manual

Manual of Steel Construction, American Institute of Steel Construction

Timber, National Design Specification for Wood, American Forest and Paper Association

Concrete, ACI 318, American Concrete Institute

Masonry, Building Code Requirement for Masonry Structures, ACI 530, American Concrete Institute

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NATURAL RESOURCES CONSERVATION SERVICE
CONSTRUCTION SPECIFICATION

WATERING FACILITY, TROUGH OR TANK

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The tank, trough, or site pads will be installed at the locations shown on the drawings.

The foundation area shall be cleared of all material not suitable for the subgrade. The foundation and the area immediately surrounding shall be graded and smoothed to permit free drainage of surface water. The tank or trough shall be placed on original ground when possible. If low areas are encountered, they will be backfilled with gravel.

Install trough or tank inlet and outlet pipes in trenches as shown on the drawings. The pipes will be placed carefully in the trench to prevent damage and the trenches will be backfilled. The trench bottom and backfill material shall be free of rocks or other sharp-edged material that could damage the pipe. Backfill will be placed such that deformation or displacement of the pipes does not occur. The backfill material will be compacted to a density equivalent to the surrounding ground.

Precast concrete, steel plastic, fiberglass, or other approved pre-manufactured troughs or tanks will be placed on the site in the manner detailed on the drawings. Embedment, anchor pads, fence or other protection will be installed as shown.

Concrete for site cast troughs or tanks shall be ready-mixed concrete (minimum 28-day compressive strength of 3,000 psi), pre-bagged commercially available concrete mix, or site mixed concrete.

Surface protection will be installed around the trough or tank as shown on the drawings.

All material used in the installation of the trough or tank will be in good condition and meet the applicable ASTM or commercial specification shown on the drawings.

Upon complete of construction, all disturbed areas will be graded smooth and blended with the surrounding ground. Vegetation will be established by applying seeding and mulching materials as described on the drawings.

Construction operations will be carried out in such a manner that erosion and air and water pollution will be minimized and held within legal limits.

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